DOCUMENT RESUME

ED 445 638 HE 033 328

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TITLE Sex Differences in the Supplemental Earnings of College and University Faculty. AIR 2000 Annual Forum Paper.
PUB DATE 2000-05-00
NOTE 36p.; Paper presented at the Annual Forum of the Association for Institutional Research (40th, Cincinnati, OH, May 21-23, 2000).
PUB TYPE Numerical/Quantitative Data (110) -- Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *College Faculty; Compensation (Remuneration); Consultants; Higher Education; *Salary Wage Differentials; *Sex Differences; *Sex Fairness; Tables (Data); Women Faculty
IDENTIFIERS *AIR Forum; National Study of Postsecondary Faculty

ABSTRACT

This study explores the extent to which college and university faculty supplement their basic institutional salaries, and whether, after controlling for differences in human capital, productivity, and structural characteristics, the tendency to supplement salary and the amount of supplemental earnings varies between women and men. Data for the study is from the 1993 National Study of Postsecondary Faculty. Variables examined were basic institutional salary, supplemental earnings (from various sources), years of experience, academic rank, family responsibilities, research productivity, whether the faculty member holds an 11/12-month or a 9/10-month contract, as well as institutional type, size, and mission. The study found that 75 percent of full-time faculty supplement their basic institutional salaries with income from other sources; private consulting is associated with a greater likelihood of receiving supplemental earnings as well as higher amounts of supplemental earnings. Women are less likely than men to supplement income and also average lower amounts than men, even after controlling for differences in human capital, productivity, and structural characteristics. These differences suggest important sex differences in the financial welfare of women versus men faculty and also in professional prestige and individual, institutional, and societal benefits that accrue to faculty who engage in private consulting. (Contains 40 references.) (CH)

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SEX DIFERENCES IN THE SUPPLEMENTAL EARNINGS OF COLLEGE AND UNIVERSITY FACULTY

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Paper presented at the annual meeting of the
Association for Institutional Research
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SEX DIFFERENCES IN THE SUPPLEMENTAL EARNINGS OF COLLEGE AND UNIVERSITY FACULTY

Prior research has consistently shown that women faculty receive lower salaries than their male counterparts even after controlling for differences in education, experience, productivity, institutional characteristics, and academic discipline (e.g., Barbezat, 1988; Weiler, 1990; Bellas, 1993; Toutkoushian, 1998; Nettles, Perna, & Bradburn, 2000). Most examinations of sex differences in faculty salaries focus on the basic salary received from the institution. While basic institutional salary is an appropriate dependent variable for exploring the extent to which women and men faculty are compensated equally by their institutions for satisfying their core responsibilities, basic institutional salary is only one part of the total package of compensation that most faculty receive. In addition to such non-monetary benefits as membership in the academic community, tenure, flexibility in the use of time, long vacations, subsidized sabbatical leaves, and access to college facilities and resources (Dillon & Marsh, 1981; Bowen & Schuster, 1986), many faculty also receive other monetary benefits including supplemental pay from their institution for special services rendered (e.g., summer teaching) and supplemental pay from non-institutional sources for consulting and other services (Bowen & Schuster, 1986).

In part because of the modest and flat pay scale for faculty salaries, the majority of faculty appear to receive supplemental earnings (Boyer & Lewis, 1985a). Based on their review of prior research, Boyer and Lewis (1985a) concluded that between 60% and 85% of faculty receive some amount of supplemental income. Despite the prevalence of supplemental earnings, however, little is known about the extent to which receiving various types and amounts of supplemental earnings varies between women and men full-time faculty. If women are less likely than men to receive supplemental earnings and/or if women tend to receive smaller amounts of these earnings than men, then the well-documented sex differences in basic institutional salaries are only magnified. Therefore, in order to improve our understanding of sex differences in the compensation of our nation's college and university faculty, this study explores differences in the types and amounts of supplemental earnings received by women and men faculty.

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Theoretical Framework

Some researchers (Marsh & Dillon, 1981; Boyer & Lewis, 1984, 1985a, 1985b) have explored the correlates of supplemental earnings. For example, among full-time faculty at four-year institutions in 1975, Marsh and Dillon (1981) found that, after controlling for academic rank, institutional type, academic field, and academic contract length, the amount of supplemental income received and the likelihood of receiving various sources of supplemental income were positively related to research productivity, unrelated to institutional service, and negatively related to teaching. Using data from the 1981 Survey of Doctorate Recipients and controlling for other variables, Boyer and Lewis (1984, 1985a, 1985b) found that faculty who consult tend to be full professors, work at a university rather than a four-year college, teach in science and engineering fields, earn higher salaries, and devote at least the same amount of time to research as other faculty. Descriptive analyses also suggest that the percent of faculty receiving supplemental earnings varies by institutional type, with a higher share of faculty at private than at public institutions reporting supplemental earnings from within their institutions (67% versus 53%) and a higher share of faculty at four-year than at two-year institutions reporting supplemental earnings from outside their institutions (55% versus 35%) (Minter, 1981 cited in Bowen & Schuster, 1985).

Based on their comprehensive review and synthesis of prior research, Boyer and Lewis (1985a) concluded that most research on faculty consulting has been conducted in the absence of a conceptual framework. This study draws upon two theoretical perspectives to explore sex differences in the supplemental earnings of college and university faculty: human capital and structural. Human capital theory focuses on the characteristics of individual workers, while structural approaches emphasize the attributes of the organizations with which individuals are connected (Youn, 1988).

According to the economic theory of human capital and neoclassical approaches to the labor market, employment outcomes are determined by an individual's productivity, the investments an individual has made in his or her productivity, and the supply of and demand for workers with similar levels and types of training and expertise. Differences in productivity are expected to be attributable to differences in the investments that individuals have made in their personal development, such as the

quantity and quality of their education, the amount of on-the-job training, their geographic mobility, and their emotional and physical health (Schultz, 1961; Becker, 1962). According to this perspective, disparities in labor market experiences within a particular academic discipline should be accounted for by variations in productivity while differences among faculty across disciplines should be attributable to differences in the supply of and demand for faculty trained in each discipline.

Despite the popularity of human capital theory for explaining labor market experiences, some economists and sociologists have noted the theory's limitations (England, 1982; DeYoung, 1989; Dreijmanis, 1991). Critics have argued that, "focusing on the supply of human skills to explain economic inequality and lack of productivity is a theoretical mistake" (DeYoung, 1989, p. 155) and that, "human capital theory has not generated an explanation of occupational sex segregation that fits the evidence" (p. 358). Among the limitations of human capital theory is its failure to adequately explain the lower returns to educational investments for women and minorities (DeYoung, 1989).

Social scientists interested in issues of social inequality and poverty have responded to the inadequacies of human capital theory by developing structural or institutional approaches to labor markets (Youn, 1988). Structural approaches to academic labor markets focus on the influence of the characteristics of the colleges and universities in which faculty were trained and work, including financial resources, student enrollment, the tenure system, and collective bargaining agreements. According to such approaches, labor market inequalities are attributable to organizational attributes including the tendency of organizations to structure positions, sort employees, and institutionalize rewards (Youn, 1992). Youn (1992) identified three forms of segmentation in the academic labor market: segmentation by academic discipline, segmentation by institutionalized job task (e.g., primarily research, primarily teaching), and segmentation by job status (e.g., full-time or part-time). Movement across segments (e.g., from mathematics to English, from a two-year institution to a research university, from part-time to full-time) is restricted. Such segmentation limits competition among faculty in different segments, thereby permitting the persistence of inequities among faculty in different segments.

Structural models posit that sex differences in employment experiences are attributable to the segregation of women in the types of institutions, academic fields, and work roles that have lower prestige and value (Smart, 1991). Some research supports this view. For example, Sorenson (1989) found that 20% of the national male-female wage difference in 1983 for all occupations, not just for faculty or higher education positions, was attributable to occupational segregation by sex after controlling for personal characteristics (e.g., tenure on the job, educational attainment, and full- or part-time status), characteristics of the occupation (e.g., education and training required to perform the job and working conditions), and attributes of the firm (e.g., geographic region, union status, size of firm, and major industry category). In higher education, the average salaries of faculty in institutions and disciplines with higher proportions of women have also been found to be lower than the average salaries of faculty in institutions and disciplines with smaller proportions of women (Barbezat, 1988; Smart, 1991; Bellas, 1994, 1997; Perna, 2000).

Research Method

This study draws upon human capital and structural approaches to academic labor markets to explore the following research questions:

1. To what extent are women and men college and university faculty supplementing their basic institutional salaries with various types of other income?
2. How does the tendency to supplement the basic institutional salary with various types of other income vary between women and men college and university faculty after holding constant differences in human capital, productivity, and structural characteristics?
3. How does the amount of various types of supplemental earnings that are received by college and university faculty vary between women and men after controlling for differences in human capital, productivity, and structural characteristics?

The 1993 National Study of Postsecondary Faculty (NSOPF:93) is used to address the research questions. Sponsored by the U.S. Department of Education's National Center for Education Statistics, the NSOPF:93 is a nationally representative sample of college and university faculty and instructional staff

who were employed by public and private non-proprietary higher education institutions in fall 1992. The sample used in these analyses is limited to individuals with faculty status, who were employed full-time with a regular appointment and some instructional duties, whose principal activity was teaching, research, or administration, and who had at least a nine-month appointment. To minimize the influence of large sample sizes and the non-simple random sample design on standard errors, each case is weighted by the NSOPF:93 weight divided by the average weight for the sample. The adjusted weighted sample used in these analyses numbers 13,359, representing 420,911 faculty nationwide.

In addition to the basic institutional salary, the NSOPF:93 includes a number of variables describing the institutional and external sources of earnings received by college and university faculty. As part of the NSOPF:93 data collection, faculty were asked to report the amount of annual earnings received from each of four institutional sources of supplemental compensation: other teaching not in basic salary; supplements not in basic salary; non-monetary compensation from the institution; and other income from the institution. Faculty were also asked to report the amount of annual earnings from each of nine external sources of supplemental earnings: employment at another academic institution; legal and medical services or counseling; outside consulting and freelance work; self-owned business other than consulting; performances and exhibitions; speaking fees and honoraria; royalties and commissions; any other employment; and any other non-monetary compensation.

Drawing on the discussion of supplemental earnings presented by Bowen and Schuster (1986), the thirteen categories of supplemental earnings on the NSOPF:93 database are aggregated into the following six: 1) total supplemental earnings from all 13 sources; 2) total supplemental earnings from the four institutional sources; 3) supplemental earnings from teaching at the institution; 4) supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria; 5) supplemental earnings from private consulting; and 6) supplemental earnings from employment at another academic or non-academic institution. Bowen and Schuster (1986) suggested that the fourth category of supplemental earnings (royalties and commissions, performances and exhibitions, and speaking fees and honoraria) describes activities that are ultimately related to teaching. Although Bowen

and Schuster (1986) also included temporary teaching at another institution in this category, in this study earnings from teaching at another institution are included in the sixth category, other employment, because of the difficulty associated with separating temporary from long-term teaching at another institution. The fifth category of supplemental earnings, private consulting, includes supplemental earnings from legal and medical services and counseling, other consulting and freelance work, and a self-owned business.

Supplemental earnings are expected to be determined by human capital investment, productivity, and structural characteristics. The level of human capital investment is reflected by the quantity and quality of education attained, the amount of on-the-job training, and geographic mobility (Schultz, 1961; Becker, 1962). Researchers have consistently found that earnings increase with educational attainment (Becker, 1962; Fox, 1981; Smart, 1991; Fairweather, 1995; Nettles, Perna, & Bradburn, 2000). In this study, the level of investment in formal education is measured by whether the highest degree is a doctoral degree, first-professional degree, or less than a doctoral or first-professional degree (reference category). Whether the individual holds his or her first or only job since earning the highest degree is the best available proxy for mobility.

One measure of on-the-job training is employment experience. Prior research has shown that earnings increase with experience but at a decreasing rate (Becker, 1962; Fox, 1981; Fairweather, 1995). This means that each additional year of experience is associated with higher earnings, but the dollar amount of the increase in earnings declines with each additional year of experience. Several measures of experience are available in the NSOPF:93 database. Because the correlations among these measures range from 0.57 to 0.72, a factor composite comprised of the following four variables is used to measure experience: age, number of years since receiving the highest degree, number of years in the current position, and number of years at the current rank. The alpha reliability coefficient for this factor is 0.86.

A second measure of experience is academic rank. In this study, a series of dichotomous variables are used to reflect the ranks of associate professor, assistant professor, and instructor, lecturer or other rank. The rank of full professor is the reference category.

Family responsibilities, responsibilities that are borne primarily by women, may influence the level of investment in human capital, continuity of labor force participation, types of employment sought, and level of job commitment (Becker, 1985; Polachek, 1977). This research controls for the possible interaction between marital and parental status by including the following dichotomous variables: married with dependents; married with no dependents; and not married with dependents. Being unmarried with no dependents is the reference category.

The basic salary received from the institution is included in the analyses as a proxy for a faculty member's preferences and tastes or motivation for supplemental earnings. In this study, "extreme" basic salaries, defined as less than $12,000 or more than $175,000, are recoded as missing.

The primary measure of research productivity included in the analyses is the total number of refereed publications in the past two years, standardized by academic field and institutional type. Following the example of Fairweather (1993), the total number of refereed publications is the sum of the number of articles in refereed journals, books, book reviews, chapters in edited books, and monographs. The measure of refereed publications used in this study differs from that used by Fairweather (1993) in that it reflects the number of refereed publications during the past two years rather than over the course of the career and because the measure used in this study is standardized by academic field and institutional type. Because of this standardization, the number of refereed publications is measured relative to the average number of refereed publications for faculty who work in the same academic field and same Carnegie classification of college or university.

Other measures of research productivity are whether the faculty member serves as a principal or co-principal investigator on at least one funded research project and the percent of time spent on research and research-related activities. Because of the non-normal distribution of the variable, percent of time spent on research is treated as a series of dichotomous variables: spend between 1% and 10% of time on research, spend between 11% and 25% of time on research, and spend more than 25% of time on research. Spending no time on research is the reference category.

Although several observers (e.g., Martin & Berry, 1969; Bowen & Schuster, 1986; Fox, 1985; Hansen, 1988; Glassick, Huber & Maeroff, 1997) have concluded that faculty reward systems emphasize research over other activities, teaching, service, and administration may also be related to supplemental earnings. Teaching productivity is measured by the percent of time spent on teaching and teaching-related activities and the level of students taught. Teaching level reflects whether an individual teaches only graduate students or only undergraduates, relative to teaching both undergraduate and graduate students. Service and administrative productivity are measured by the percent of time allocated to each of these activities. Because of their non-normal distributions, both the percent of time spent on service and the percent of time spent on administration are treated as a series of dichotomous variables rather than as continuous variables. Chairing the department is an additional measure of administrative productivity. Whether a faculty member spends at least some time on consulting is a final measure of productivity.

Structural approaches to academic labor markets posit that structural characteristics influence labor market status by constraining employment experiences. One structural attribute is whether a faculty member holds an eleven- or twelve-month contract rather than a nine- or ten-month contract. The Carnegie classification of the institution at which the faculty member works is used to control for such structural characteristics as institutional resources, size, and mission. The categories included in the analyses are: research university, doctoral university, private liberal arts college, public two-year institution, and other institution (e.g., private two-year, specialized). Comprehensive institution is the reference category. Institutional control (public or private) and institutional race (predominantly Black college or university, yes or no) are additional measures of institutional resources.[1] A dichotomous variable reflecting unionization is also included since unionization has been shown to be associated with both higher wages and a smaller African American-White salary gap (Ashraf, 1994).

Prior research has shown that faculty reward systems vary by academic discipline (e.g., Tuckman & Hagemann, 1976; Smart & McLaughlin, 1978; Tuckman, 1979; Marshall & Perrucci, 1982; Pfeffer & Langton, 1988) and that these differences can be understood in terms of Biglan's (1973) categorization of academic fields (Smart & McLaughlin, 1978). Therefore, using the dimensions identified by Biglan

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(1973) each academic field is categorized in terms of "pure" versus "applied," "hard" versus "soft," and whether concerned with life systems. To minimize the amount of missing data, a fourth variable, unknown academic field, is also included.

The following racial/ethnic groups are considered in the analyses: African American, Hispanic, and Asian. White is the reference group. A dichotomous variable measuring U.S. citizenship is also included. The proportion of faculty who are not citizens of the United States varies by racial/ethnic group, ranging from 4% of Whites and 7% of African Americans, to 16% of Hispanics and 36% of Asians.

Descriptive statistics, including chi-square and analysis of variance, are first used to examine the research questions. Then, logistic regression analyses are used to isolate the effects of sex on the probability of receiving supplemental earnings, a dichotomous variable, holding constant differences in human capital investment, productivity, and structural characteristics. Among faculty who have supplemental earnings, ordinary least squares regression analyses are used to isolate the effects of sex on the amount of supplemental earnings received after controlling for human capital investment, productivity, and structural characteristics. The logistic and OLS regression analyses are repeated to compare the relationship between sex and each of the six categories of supplemental income. To facilitate the interpretation of the logistic regression coefficients, the delta-*p* statistic is used to estimate the change in the probability of receiving supplemental earnings associated with a one-unit change in each independent variable (Cabrera, 1994). For the OLS regression analyses, earnings are expressed as a natural logarithm so that the unstandardized regression coefficients reflect the percent change in earnings associated with a one-unit change in each independent variable. Given the size of the sample and the number of independent variables in the regression family, only variables that are statistically significant at the $p < .01$ level are considered to be different from zero.

Findings

Observed Sex Differences in Supplemental Earnings

About three-fourths (75%) of all full-time faculty at four-year and two-year institutions in fall 1992 received some type and amount of income to supplement their basic salaries. The most common

source of supplemental earnings was additional teaching at the institution, reported by 38% of faculty. Table 1 shows that 31% of full-time faculty in fall 1992 received supplemental earnings from private consulting, 26% received supplemental earnings from royalties, performances, and speaking fees, and 10% received supplemental earnings from employment at another academic or non-academic institution.

Table 1. Percent of men and women full-time faculty who received supplemental earnings

Type of earnings	Total	Men	Women	Statistical Difference
Any supplemental earnings	75.3	78.1	69.3	$p < .001$
Institutional supplements:				
Any institutional supplement	52.8	55.2	47.7	$p < .001$
Other teaching	37.5	39.1	34.1	$p < .001$
Other supplements	17.5	19.0	14.5	$p < .001$
Non-monetary compensation	2.9	3.1	2.4	
Other income	6.7	6.5	7.4	
Non-institutional supplements:				
Any royalties, performances, or fees	25.8	28.0	21.1	$p < .001$
Performances or exhibitions	3.4	3.8	2.7	$p < .001$
Speaking fees/honoraria	17.1	17.9	15.4	$p < .001$
Royalties or commissions	11.1	13.0	7.1	$p < .001$
Any private consulting	30.6	34.2	22.9	$p < .001$
Legal/medical services	3.1	2.9	3.5	
Outside consulting	24.1	27.1	17.8	$p < .001$
Self-owned business	6.0	7.2	3.4	$p < .001$
Any other employment	10.4	10.1	11.2	
Employment at other academic institution	5.7	5.9	5.4	
Other employment	5.1	4.5	6.2	$p < .001$

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF:93)

A higher share of men than women are observed to receive most types of supplemental earnings. About 78% of men, but only 69% of women, are observed to receive some type and amount of supplemental earnings. About 39% of men received income from additional teaching at their institution, compared with 34% of women. More than one-fourth (28%) of men, but only one-fifth (21%) of women, reported earnings from royalties and commissions, performances and exhibitions, and speaking fees and

honoraria. Only 23% of women received income from private consulting, compared with 34% of men. Similar proportions of men and women reported earnings from other employment (about 10%).

Among the 75% of faculty who received at least some amount of supplemental earnings in fall 1992, the average amount received was about $13,500. Table 2 shows that men averaged substantially higher amounts of supplemental earnings than women overall ($15,004 versus $9,809), from institutional sources ($8,743 versus $6,155) including teaching at the institution ($6,897 versus $4,789), and from private consulting ($13,284 versus $7,777). Men and women averaged comparable amounts of supplemental earnings from royalties, performances, and speaking fees (about $4,200) and from other employment (about $11,000). Table 3 shows that total supplemental earnings represented a higher share of the basic institutional salary for men than for women (24% versus 19%).

Table 2. Average amount of supplemental earnings received by men and women full-time faculty receiving some amount of the type of earnings: Fall 1992

Type of earnings	Total	Men	Women	Statistical Difference
Any supplemental earnings	13,467	15,004	9,809	$p < .001$
Institutional supplements:				
Any institutional supplement	7,991	8,743	6,155	$p < .001$
Other teaching	6,280	6,897	4,789	$p < .001$
Other supplements	6,767	7,659	4,306	$p < .001$
Non-monetary compensation	6,188	7,513	2,658	$p < .05$
Other income	7,422	6,945	8,305	
Non-institutional supplements:				
Any royalties, performances, or fees	4,212	4,222	4,185	
Performances or exhibitions	5,056	4,340	7,169	
Speaking fees/honoraria	1,963	1,966	1,955	
Royalties or commissions	5,207	5,127	5,521	
Any private consulting	11,957	13,284	7,777	$p < .001$
Legal/medical services	17,679	21,411	11,083	$p < .001$
Outside consulting	9,553	10,723	5,792	$p < .001$
Self-owned business	13,650	14,244	10,976	
Any other employment	11,032	11,358	10,414	
Employment at other academic institution	11,300	10,523	13,079	
Other employment	9,892	11,519	7,366	

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF:93)

Table 3. Selected characteristics of men and women full-time faculty: Fall 1992

Characteristic	Total	Men	Women	Statistical Difference
Supplemental earnings as % of base salary	.23	.24	.19	$p < .001$
Hours per week paid but not by institution	2.6	3.0	2.0	$p < .001$
Percent time spend on consulting	.03	.03	.02	$p < .001$
Prefer to spend more time on consulting	.17	.17	.17	
Very satisfied freedom to do consulting	.37	.40	.32	$p < .001$
Highest degree – PhD	.58	.64	.44	$p < .001$
Highest degree - Professional	.09	.11	.07	$p < .001$
Experience composite	1.20	1.23	1.14	$p < .001$
Full professor	.33	.41	.17	$p < .001$
Associate professor	.25	.26	.23	$p < .001$
Assistant professor	.22	.19	.30	$p < .001$
Instructor, lecturer, other rank	.20	.15	.30	$p < .001$
Married with dependents	.60	.70	.40	$p < .001$
Married, no dependents	.15	.12	.22	$p < .001$
Not married, with dependents	.08	.06	.12	$p < .001$
Basic salary / 1000	47.57	51.39	39.56	$p < .001$
Refereed publications	.55	.60	.43	$p < .001$
PI or co-PI for any grants	.24	.28	.16	$p < .001$
No time on research	.24	.21	.30	$p < .001$
1% to 10% time on research	.32	.28	.39	$p < .001$
11% to 25% time on research	.19	.21	.16	$p < .001$
More than 25% time on research	.25	.30	.15	$p < .001$
Time on teaching	.56	.53	.61	$p < .001$
1% to 10% time on service	.42	.40	.46	$p < .001$
> 10% time service	.13	.13	.13	
1% to 10% time administration	.42	.45	.37	$p < .001$
> 10% time administration	.19	.20	.19	
Any time consulting	.29	.32	.23	$p < .001$
11 or 12 month appointment	.31	.32	.30	$p < .01$
Research university	.29	.33	.22	$p < .001$
Doctoral university	.14	.15	.12	$p < .001$
Private liberal arts college	.07	.07	.08	$p < .05$
Public two-year	.21	.17	.29	$p < .001$
Other type of institution	.07	.07	.06	$p < .05$
Pure rather than applied field	.42	.44	.37	$p < .001$
Hard rather than soft field	.27	.33	.15	$p < .001$
Life rather than non-life field	.39	.35	.48	$p < .001$

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF:93)

While more than one-fourth (29%) of all full-time faculty devoted at least some time each week to consulting, the amount of time spent on consulting appears to be quite modest. Table 3 shows that, on average, full-time faculty spent just 3% of their time on consulting. Men were more likely than women to spend at least some time to consulting (32% versus 23%). Although comparable proportions of men and women faculty would prefer to spend more time on consulting than they actually allocate (about 17%), a higher share of men than women faculty were very satisfied with their "freedom" to do outside consulting (40% versus 32%).

Sex Differences in Supplemental Earnings After Controlling for Other Differences

The logistic regression analyses reveal that, even after controlling for differences in human capital investment, productivity, and structural characteristics, women are about 8% less likely than men to receive some type of supplemental earnings, 10% less likely than men to receive supplemental earnings from institutional sources, 12% less likely than men to receive supplemental earnings from teaching at their institution, and 7% less likely than men to receive supplemental earnings from private consulting. Table 4 shows that, after controlling for human capital investment, productivity, and structural characteristics, women are as likely as men to receive supplemental earnings from royalties, performances, and speaking fees, and from other employment.

Among recipients of most types of supplemental earnings, women also average lower amounts of supplemental earnings than men even after controlling for human capital investment, productivity, and structural characteristics. Table 5 shows that, among recipients, women average lower amounts than men of supplemental earnings overall (39% lower), supplemental earnings from institutional sources (30% lower), supplemental earnings from teaching at the institution (26% lower), and supplemental earnings from private consulting (45% lower). Sex differences in the amount of supplemental earnings from other employment are marginally statistically significant ($p < .05$). The amount of supplemental earnings received from royalties, performances, and speaking fees appears to be comparable for women and men holding constant differences in human capital investment, productivity, and structural characteristics.

Table 4. Increase in the probability of receiving various types of supplemental earnings associated with a one-unit increase in each independent variable (delta-p statistics)

Independent variable	Any Supplemental	Any Institutional	Teaching At institution	Royalties, Speaking fees	Private Consulting	Other Employment
Female	-.075 ***	-.097 ***	-.116 ***	.000	-.068 ***	-.008
African American	-.066 **	-.036	-.020	-.025	-.046	.007
Hispanic	-.008	-.039	-.026	.038	.003	.008
Asian	-.063 **	-.049 *	-.024	-.085 ***	-.077 **	.016
Non citizen	.066 ***	.021	.012	.021	.187 ***	.014
Highest degree – PhD	-.009	.038 **	.049 ***	-.007	-.012	-.008
Highest degree - Professional	.047 **	.089 ***	.031	-.033	.021	-.036 **
First/only job	-.072 ***	-.021	-.010	-.040 ***	-.113 ***	-.062 ***
Experience composite	-.034	-.040	.084 *	-.002	.103 **	-.040 *
Experience composite, squared	.001	.000	-.002	-.007 *	-.007	.006 *
Associate professor	-.011	.012	.020	-.030 **	-.019	-.021 **
Assistant professor	-.060 ***	.000	-.016	-.082 ***	-.007	-.034 ***
Instructor, lecturer or other rank	-.066 ***	-.033	-.045 *	-.072 ***	-.021	-.028 **
Married with children	.039 ***	.040 **	.030 *	-.018	.060 ***	.007
Married, no children	.020	-.007	-.011	.008	.061 **	-.004
Not married, children	.063 ***	.047 *	.069 ***	.000	.053 *	.026 *
Basic salary / 1000	.000	-.002 ***	-.005 ***	.002 ***	.001 *	-.001 ***
Refereed publications	.029 **	-.003	-.020 *	.118 ***	.040 ***	.003
Principal investigator	.032 **	.038 **	-.061 ***	.012	.042 **	-.022 **
1 - 10% time on research	.017	.041 **	.035 *	.079 ***	-.017	-.014
11% to 25% time on research	.040 **	.050 **	.069 ***	.151 ***	.012	-.009
More than 25% time on research	.059 ***	.039	.045 *	.180 ***	-.007	-.020
Percent time on teaching	.001 ***	.001 *	.002 ***	.000	.000	.000
Teach only graduate students	.033 *	.045 **	-.026	.010	.021	-.009
Teach only undergraduates	.012	.018	-.003	.005	-.011	.015
1% to 10% time on service	.051 ***	.047 ***	.060 ***	.044 ***	.035 **	.008
More than 10% time on service	.051 ***	.062 ***	.051 **	.061 ***	.042 *	.013
1% to 10% time administration	-.046 ***	-.064 ***	-.038 ***	-.025 **	-.012	.008
More than 10% time administration	-.107 ***	-.113 ***	-.098 ***	-.032	-.040 *	.015
Department chair	.025 *	.065 ***	.011	.023	.003	.004
At least some time on consulting	.174 ***	.053 ***	.072 ***	.134 ***	.480 ***	.062 ***

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Table 4. Increase in the probability of receiving various types of supplemental earnings associated with a one-unit increase in each independent variable (delta-p statistics) (continued)

Independent variable	Any Supplemental	Any Institutional	Teaching At institution	Royalties, Speaking fees	Private Consulting	Other Employment
11 or 12 month appointment	-.181 ***	-.242 ***	-.197 ***	-.019	-.024 *	-.015 *
Research university	.004	-.072 ***	-.118 ***	.060 ***	.022	.005
Doctoral university	-.013	-.023	-.050 **	.034 *	-.032	.007
Private liberal arts college	.005	.030	.098 ***	-.031	.043	-.001
Public two-year institution	.052 ***	.120 ***	.101 ***	-.045 **	-.017	.048 ***
Other institution	.016	-.004	-.028	.036	-.016	.001
Public institution	-.029 *	-.028 *	.022	-.020	.002	-.034 ***
Black institution	.008	-.014	-.019	-.018	-.014	.045 **
Unionized institution	-.003	-.002	.002	-.009	.007	.008
Pure rather than applied field	.012	.006	-.011	.069 ***	-.061 ***	.002
Hard rather than soft field	-.071 ***	-.024 *	-.027 *	-.125 ***	.004	-.005
Life systems oriented field	.006	-.025 *	-.005	.007	.008	.027 ***
Unknown field	-.034	-.018	-.030	.024	-.041	.006
Constant	.151 ***	.185 **	-.057	-.214 ***	-.283 ***	-.062 **
Number cases in analyses	12,402	12,402	12,402	12,402	12,402	12,402
χ^2, df	1,647 44***	1,260 44***	1,956 44***	1,846 44***	3,579 44***	589 44***
-2 log likelihood	12,372	16,016	14,512	12,500	11,865	7,668
G^2/df	1.0	1.3	1.2	1.0	1.0	0.6
Pseudo R^2	.117	.092	.136	.130	.224	.045
Percent correctly classified	64%	63%	65%	67%	78%	63%
Percent with supplemental	62%	67%	73%	69%	67%	67%
Percent with no supplemental	72%	58%	61%	66%	83%	62%
Baseline *P*	75%	53%	38%	26%	31%	10%

Notes: Percent of cases correctly classified corrected for the non 50/50 observed distribution.

The delta-*p* is used to represent the change in the probability of receiving supplemental earnings associated with a one unit change in each independent variable (Cabrera, 1994).

Delta-$p = \exp(L_1)/[1 + \exp(L_1)] - P_0$

Pseudo $R^2 = \chi^2/(N+\chi^2)$

*** $p < .001$, ** $p < .01$, * $p < .05$

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF:93)

Table 5. Percentage increase in the amount of various types of supplemental earnings received associated with a one-unit increase in each independent variable (unstandardized regression coefficients)

Independent variable	Any Supplemental	Any institutional	Teaching at institution	Royalties, speaking fees	Private consulting	Other employment
Female	-.387***	-.301***	-.256***	-.108	-.446***	-.214*
African American	.071	.041	.045	.287*	.149	-.050
Hispanic	-.033	-.040	.008	.050	.327*	-.116
Asian	.194**	.239***	.289***	.151	.207	.320
US citizen	.011	-.018	.095	-.006	-.182	.029
Highest degree – PhD	.082*	.095*	.062	-.052	.021	.214 *
Highest degree – Professional	.382***	.378***	.092	.161	.355***	.471*
First/only job	-.271***	.035	.007	-.036	-.640***	-.359**
Experience factor	.071	-.050	.120	.452*	1.034***	-.214
Experience factor, squared	.028**	.004	-.002	.007	.023	.114***
Associate professor	-.142***	-.064	.005	-.140*	-.127*	-.222*
Assistant professor	-.129**	-.090*	-.102*	-.325**	-.084	.081
Instructor, lecturer, other rank	-.064	-.002	-.005	-.150	.000	.095
Married with dependents	.223***	.120**	.063	.090	.232**	.131
Married, no dependents	.023	-.008	-.020	.115	.166	-.008
Not married, with dependents	.165**	.168**	.125*	-.120	.159	.307*
Basic salary / 1000	.004***	.008***	.009***	.012***	.001	-.001
Refereed publications	-.045	-.026	.009	.064	-.066	-.065
PI or co-PI for any grants	.139***	.152***	-.029	-.007	.090	.311*
1% to 10% time on research	-.214***	-.084*	-.093*	-.544***	-.337***	-.273**
11% to 25% time on research	-.252***	-.063	-.038	-.435***	-.488***	-.291*
More than 25% time on research	-.526***	-.085	.044	-.522***	-.836***	-.542**
Percent time on teaching	-.006***	-.003***	.000	-.005**	-.011***	-.008**
Teach only graduate students	.027	-.002	.035	.069	.086	.061
Teach only undergraduates	-.103**	-.179***	-.117**	.055	-.036	.064
1% to 10% time on service	-.127***	-.073*	-.039	-.181**	-.364***	-.124
> 10% time service	-.018	-.040	.052	-.216*	-.165*	-.310*
1% to 10% time administration	-.060	-.004	.042	-.101	-.269***	-.140
> 10% time administration	-.215***	-.029	.059	-.360***	-.646***	-.473**
Department chair	.096*	-.013	.036	.217**	.067	.306**
Any time consulting	.500***	.052	.005	.340***	.365***	-.017

Table 5. Percentage increase in the amount of various types of supplemental earnings received associated with a one-unit increase in each independent variable (unstandardized regression coefficients) (continued)

Independent variable	Any Supplemental	Any institutional	Teaching at institution	Royalties, speaking fees	Private consulting	Other employment
11 or 12 month appointment	-.366***	-.269***	-.352***	-.167**	.035	-.080
Research university	.126**	.140**	.025	.245**	.188*	.395**
Doctoral university	.070	.090*	.071	.087	.033	.174
Private liberal arts college	-.248***	-.138*	-.144*	-.120	-.184	-.232
Public two-year	.170***	.122**	.044	-.134	.098	.112
Other type of institution	-.045	-.047	-.005	.215	-.076	-.140
Public institution	-.040	.076*	.217***	-.012	-.158*	-.158
Black institution	.183*	.092	.136	.003	.272	.309
Unionized institution	.013	-.020	.004	-.035	.159**	.064
Pure rather than applied field	-.210***	-.066*	.006	-.285***	-.362***	-.072
Hard rather than soft field	-.059	.060	-.025	-.460***	-.137*	.159
Life rather than non-life field	-.017	.012	-.044	-.194**	.157**	.197*
Unknown field	-.154**	-.155**	-.107	-.105	.029	.169
Constant	9.113***	8.399***	7.696***	6.704***	8.408***	9.047***
Number cases in analyses	9,373	6,548	4,634	3,861	3,264	1,281
R^2	.158	.147	.125	.176	.157	.112
Adjusted R^2	.154	.142	.116	.167	.146	.080

Source: Analyses of 1993 National Study of Postsecondary Faculty (NSOPF:93)

In addition to being less likely than men to receive most types of supplemental earnings and to averaging lower amounts than men of most types of supplemental earnings, women also appear to be disadvantaged relative to men in the supplemental earnings determination process. In other words, a smaller share of women than men appear to possess the characteristics and attributes that promote supplemental earnings. For example, the results of this study show that, after controlling for human capital investment, productivity, and structural characteristics, faculty holding the rank of assistant professor are less likely than faculty holding the rank of full professor to receive any type of supplemental earnings, supplemental earnings from royalties, performances, and speaking fees, and supplemental earnings from other employment. Assistant professors also average lower amounts than full professors of total supplemental earnings and supplemental earnings from royalties, performances, and speaking fees. A higher share of women than men realize these supplemental earnings "penalties", however, since the descriptive analyses show that a substantially higher proportion of women than men hold the rank of assistant professor (30% versus 19%).

Women are also disadvantaged relative to men with regard to the relationship between supplemental earnings and various measures of productivity. Research productivity generally appears to be positively related to supplemental earnings. For instance, the probability of receiving any type of supplemental earnings, particularly supplemental earnings from royalties, performances, and speaking fees and supplemental earnings from private consulting, increases with the number of refereed publications in the past two years (standardized by academic field and institutional type). Serving as the principal or co-principal investigator on at least one funded research project is associated with higher probabilities of receiving any supplemental earnings, supplemental earnings from the institution, and supplemental earnings from private consulting and higher average amounts of supplemental earnings overall and from the institution. A smaller share of women than men receive the benefits in supplemental earnings associated with research activities since the number of recent refereed publications standardized by field and institutional type is lower for women than for men (.43 versus .60) and since only 16% of women but 28% of men serve as the principal or co-principal investigator on at least one funded research

project. Similarly, although faculty who spend at least some time on consulting are more likely to receive all types of supplemental earnings (Table 4) and average higher amounts of total supplemental earnings, supplemental earnings from royalties, performances, and speaking fees, and supplemental earnings from private consulting (Table 5) net of other variables, a substantially smaller percentage of women than men spend at least some time on consulting (Table 3, 23% versus 32%).

While Boyer and Lewis (1985b) found that faculty who earn higher salaries are more likely than other faculty to receive income from consulting after controlling for other variables, the findings from this research suggest that the relationship between supplemental earnings and basic institutional salary depends on the source of supplemental earnings. After controlling for differences in human capital investment, productivity, and structural characteristics, the probability of receiving supplemental earnings from royalties, performances, and speaking fees increases as basic institutional salary increases. But, the probability of receiving supplemental earnings from institutional sources, including teaching at the institution, and the probability of receiving supplemental earnings from other employment decrease as basic institutional salary increases. The average amounts of total supplemental earnings, institutional supplemental earnings, supplemental earnings from teaching, and supplemental earnings from royalties, performances, and speaking fees increase with basic institutional salaries after controlling for human capital investment, productivity, and structural characteristics. A smaller share of women than men are realizing the premiums in the amounts of supplemental earnings associated with higher institutional basic salaries, however, as the descriptive analyses show that women average lower basic institutional salaries than men ($39,560 versus $51,390).

Like research showing the salary premiums accruing to male faculty who are married (Toutkoushian, 1998) and have children (Barbezat, 1988), this research suggests that male faculty who are married with children are also at an advantage relative to female faculty with regard to supplemental earnings. Compared with their single, childless counterparts, faculty who are married with children are more likely to receive, and receive higher amounts of, supplemental

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earnings from their institution, and supplemental earnings from private consulting. Nonetheless, only 40% of women full-time faculty are married with children, compared with 70% of men full-time faculty.

In addition to sex differences, the analyses also reveal several racial/ethnic group differences in supplemental earnings. Both African Americans and Asians are less likely than Hispanics and Whites to receive some type of supplemental earnings. Asians are also less likely than faculty of other racial/ethnic groups to receive supplemental earnings from royalties, performances, and speaking fees and supplemental earnings from private consulting even after controlling for differences in human capital investment, productivity, and structural characteristics. Among recipients of supplemental earnings, however, the average total amount received is 19% higher for Asians than for faculty of other racial/ethnic groups net of other differences. Compared with faculty of other racial/ethnic groups and after controlling for differences in human capital investment, productivity, and structural characteristics, Asians also average higher amounts of supplemental earnings from institutional sources, particularly teaching at the institution.

Discussion

Considering total earnings from all sources is appropriate for examining the "financial welfare" of faculty (Bowen & Schuster, 1986) and for comparing the compensation of faculty with the compensation other professionals (Dillon & Marsh, 1981). The results of this study show that the majority (75%) of full-time faculty are supplementing their basic institutional salaries with income from other sources. But, women are not only less likely than men to receive most types of supplemental income, but also average lower amounts than men of most types of supplemental earnings even after controlling for differences in human capital investment, productivity, and structural characteristics. When considered with the results of research showing lower average institutional basic salaries for women than men (e.g., Barbezat, 1988; Weiler, 1990; Bellas, 1993; Toutkoushian, 1998; Nettles, Perna, & Bradburn, 2000), the results of this study reveal an additional source of sex differences in the financial welfare of the nation's faculty.

One possible explanation for the findings that women are less likely than men to receive most types of supplemental earnings and that women receive lower amounts than men of most types of supplemental earnings is that these differences reflect differences between women and men in variables that are related to supplemental earnings but are omitted from the model. The modest size of the pseudo R^2s for the logistic regression analyses (ranging from .045 to .224) and the adjusted R^2s for the OLS regression analyses (ranging from .08 to .167) suggests that the human capital investment, productivity, and structural variables included in the model are insufficient predictors of supplemental earnings. For instance, basic institutional salary may be an inadequate proxy for motivation for, or interest in, receiving supplemental earnings. Future research should explore ways in which the conceptual framework used in this research should be modified to better understand the predictors of supplemental earnings.

The results of this research have several important implications for college and university administrators, although these implications vary based on the source of supplemental earnings. With regard to institutional sources of supplemental earnings, the results suggest that women full-time faculty have fewer opportunities than men full-time faculty to earn supplemental earnings from their institutions, particularly from additional teaching. A smaller proportion of women than men are observed to receive any type of supplemental earnings from their institutions, particularly from teaching at their institution. Women are observed to receive lower amounts of both these categories of supplemental earnings as well. Moreover, these sex differences persist even after controlling for differences between women and men in human capital investment, productivity, and structural characteristics. In other words, sex differences in the variables that are related to the probability of receiving institutional supplemental earnings, and the amount of institutional supplemental earnings received, only partially explain the smaller percentage of women observed to receive these earnings and the lower amount of earnings observed to be received by women. Therefore, individual colleges and universities are urged to use these findings to examine their policies and practices regarding institutional sources of supplemental earnings to ensure that opportunities to earn this source of supplemental earnings are equally available to women and men. Institutions should also explore the extent to which women are less likely to receive supplemental earnings from their

institutions because they prefer not to engage in such activities rather than because they have less information about such opportunities or are otherwise discouraged from pursuing such opportunities.

A second set of conclusions and implications pertains to the findings regarding supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria. Bowen and Schuster (1986) argued that this category of supplemental earnings has not only "long been accepted as part of the established academic way of life" but also "regarded as an almost mandatory part of a distinguished academic career" (Bowen & Schuster, 1986, p. 257-258). Although a smaller share of women than men full-time faculty in fall 1992 were observed to receive supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria, the logistic regression analyses revealed that this observed sex difference is entirely attributable to other differences between women and men that are related to receiving supplemental earnings from this source, particularly differences in academic rank, basic institutional salary, research activities, time on consulting, institutional type, and academic field. Therefore, in order to increase the share of women who are receiving the monetary and prestige-related benefits associated with supplemental earnings from royalties and commissions, performances and exhibitions, and speaking fees and honoraria, individual colleges and universities must work to ensure that women have equal opportunity to acquire the factors shown to promote this source of supplemental earnings. Specifically, colleges and universities should review their policies and practices to ensure that women have equal access to full-time faculty positions at research universities, the highest rank of full professor, the highest basic institutional salaries, and the resources required to promote research productivity.

Supplemental earnings from other sources are more controversial. Some have argued that private consulting may cause faculty to neglect their students and other academic and campus responsibilities, may result in an abuse of academic freedom and conflicts of interest, may entail an inappropriate use of institutional resources (e.g., offices, computers, telephones, support staff), and may reduce institutional loyalty (Boyer & Lewis, 1984, 1985a, 1985b; Bowen & Schuster, 1986). Private consulting has also been said to be inconsistent with the traditional mission of higher education because it involves a limited

sharing of expertise between a faculty member and a private client rather than the broad dissemination of learning (Bowen & Schuster, 1986). Despite these criticisms, some research indicates that faculty who consult are at least as productive as other faculty with regard to teaching, research, and institutional service (Boyer & Lewis, 1984, 1985a, 1985b).

Moreover, based on their review and synthesis of relevant research, Boyer and Lewis (1984, 1985a, 1985b) concluded that faculty consulting may be beneficial to individuals, institutions, and society. For individual faculty members, consulting and other sources of supplemental earnings provide additional income to compensate for the ceiling on faculty earnings and the lower average salaries for faculty than for comparably trained individuals in other professions. Through consulting, faculty may also enhance their teaching and research resources and expertise, disseminate knowledge to interested individuals outside of the institution, become involved in practical affairs, gain "real-world" experience, update their disciplinary expertise and research methodology, develop new ideas for further research, build their professional competence and reputation, advance their careers, and enhance their vitality (Bok, 1982; Bowen & Schuster, 1986; Boyer & Lewis, 1984, 1985a, 1985b; Lawson, 1996). Based on his review of institutional statements regarding faculty consulting, Teague (1982) concluded that consulting is generally only institutionally sanctioned if such activities do not conflict with institutional responsibilities, enhance professional development, and are compatible with institutional priorities.

Institutions may benefit from faculty consulting through an enhanced ability to attract and retain outstanding faculty because they are permitted to supplement their salaries, greater institutional vitality because of enhanced faculty vitality, increased professional reputation of individual departments and the institution as a whole, enhanced contribution to the community, more employment and internship opportunities for students, increased public good will toward the institution, and greater access to private-sector, government, and foundation grants and contracts to supplement institutional resources (Teague, 1982; Bowen & Schuster, 1986; Boyer & Lewis, 1984, 1985a, 1985b). Consulting may also be considered an important form of service and, as such, advancing the core mission of an institution (Boyer & Lewis, 1985b). Society may benefit from faculty consulting through greater access to the specialized

talent and expertise that is relevant to a variety of problems and that can be utilized only as needed as well as the promotion of technological development through the transfer of ideas and research findings to business and the community (Bok, 1982; Boyer & Lewis, 1984, 1985a, 1985b).

Women faculty are less likely than men faculty to realize the potential benefits associated with private consulting. Even after controlling for differences in human capital investment, productivity, and structural characteristics, women are less likely than men to receive, and average lower amounts than men, of supplemental earnings from private consulting. Therefore, in addition to reviewing institutional policies and practices to ensure that women are not unfairly disadvantaged with regard to the variables that promote private consulting (e.g., having a greater number refereed publications, spending more time on research, working in an applied field), individual colleges and universities should also examine the extent to which other policies and practices may be discouraging women from realizing earnings from private consulting. Perhaps women have less access than men to the networks that lead to private consulting opportunities, are less skilled at identifying and establishing private consulting relationships, and/or are less knowledgeable about the variety of related benefits.

In particular, this study revealed that spending at least some time on consulting is associated with a greater likelihood of receiving all types of supplemental earnings and a higher amount of most types of supplemental earnings even after controlling for human capital investment, productivity, and structural characteristics. Women are less likely than men to realize these benefits, however, since a smaller share of women than men allocate at least some time to consulting (23% versus 32%). Given the potential benefits to individuals, institutions, and society, colleges and universities should examine the extent to which current policies encourage and discourage faculty from engaging in consulting. Given that a smaller proportion of women than men are very satisfied with their freedom to do consulting (32% versus 40%), institutions should also examine the extent to which particular policies and practices impact women and men differently.

The results of this research also reveal that about 10% of both women and men faculty receive supplemental earnings from employment at another academic or non-academic institution. Although

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women and men appear to be equally likely to receive supplemental earnings from other employment and to average comparable amounts of supplemental earnings from this source, the extent to which outside employment contributes to or detracts from the fulfillment by women and men faculty of their core responsibilities at the primary institution is unclear. Unlike for institutional supplemental earnings, holding an 11 or 12 month appointment rather than a nine or ten month appointment is only marginally ($p < .05$) related to the likelihood of receiving supplemental earnings from outside employment. This suggests that these earnings are no more likely to be generated during the summer months than during the academic year. As with institutional sources of supplemental earnings, faculty who receive lower basic institutional salaries are more likely than their better paid counterparts to engage in outside employment, suggesting that lower paid faculty may be motivated to pursue both institutional and other employment for economic reasons. This contrasts with the positive relationship between basic salaries and supplemental earnings from consulting, which suggests that faculty who consult are not motivated by economic concerns. Further research is required to understand the extent to which outside employment activities are related to the profession and academic discipline of women and men faculty, and the effects of outside employment on the performance of core responsibilities and career advancement, particularly among women and men junior faculty.

In summary, this research points to important differences in supplemental earnings between women and men faculty. These differences suggest important sex differences not only in the financial welfare of women and men faculty, but also in the professional prestige- and vitality-related benefits associated with particular types of supplemental earnings. Although faculty currently spend a minimal amount of time on consulting (less than 3% of their time, on average), prior research suggests that a number of individual, institutional, and societal benefits accrue to faculty who engage in private consulting. Future research should further explore the sex differences identified in this research by examining sex differences in the patterns of faculty consulting over the course of the career, personal preferences for consulting, costs and benefits of consulting, and institutional barriers to and facilitators of consulting.

Note:

[1]The NSOPF:93 does not contain a variable to indicate whether an individual works at an historically black college or university. Therefore, an institution in which African Americans comprise at least 50% of the student body is classified as predominantly black.

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